



Town of Westford Wireless Facility Planning

Public Workshop
November 16, 2010

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 - IEEE Communications Society
- The only international certification of wireless engineering experts

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Wireless Coverage

- What?
 - ✓ To evaluate what the present status of wireless service is in Westford.
- Why?
 - ✓ Federal law requires towns to not prevent the provision of wireless services.
 - ✓ The law retains town zoning rights, but not at the expense of providing service.
 - ✓ Towns like Westford have been sued by carriers because of zoning denials

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Wireless Coverage

- How?
 - ✓ Public process
 - To become informed
 - To discuss what's best for protecting the character of the Town while enabling sensible wireless development
- Where?
 - ✓ Look at Town-wide coverage
 - ✓ Meet in open meetings
 - ✓ Town website at www.westfordma.gov/wca

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Wireless Coverage

- And finally.... Who?
 - ✓ Town planning staff
 - ✓ Town officials
 - ✓ Independent Expertise
 - ✓ Town attorney
 - ✓ And... any interested resident

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Wireless Coverage

Project to address:

- ✓ Current state of wireless services
- ✓ Impact of wireless expansion on communities
- ✓ Wireless coverage in Westford
- ✓ Planning options

Today's discussion:

- ✓ The current state of wireless in Westford

Future work:

- ✓ Propose and discuss options for what to do to stay one step ahead of wireless development

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Wireless Coverage

• Wireless Communications Are a Fact of Life

- ✓ 280 million subscribers in USA (Source: CTIA)
 - Population 306 million
- ✓ Wireless/wired tipping point reached-
 - As many households without land lines as there are households without wireless phones.
- ✓ Data is the next big thing
 - 70% of all data traffic comes from buildings



❖ Text messages, video/picture messages, internet browsing, gaming, user apps.



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Wireless Coverage

- Growth Pressure
 - ✓ New competitors in the market
 - MetroPCS - flat rate pay-in-advance subscriptions
 - Clearwire - "4G" technology & Internet Protocol – "WiMAX"
 - ✓ New spectrum being developed
 - Traditional users of Cellular and PCS spectrum adding New "AWS" "700 MHz" spectrum bought at auction
 - Companies are consolidating resources
 - ❖ AT&T/Cingular merger, Sprint/Nextel merger, Clearwire/Sprint relationship

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Wireless Coverage

- Impact on Communities
 - ✓ 3G and 4G technologies need more bandwidth
 - Requires more radio channels and more cell sites
 - Smaller coverage area for each cell site equates to
 - ❖ More capacity for data services per customer
 - ❖ Better quality signal to each customer
 - ❖ Lower antenna heights (typically limited by tree height)
 - » Less co-location room at each site



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Wireless Coverage

- Impact on Communities
 - ✓ Cell Sites Will Be Closer to the Subscriber
 - E.g. in residential areas
 - ✓ Wireless will begin to compete with cable and telco for Internet connectivity at the home



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Wireless Facilities

- What is a Cell Site?
 - ✓ Any installation of wireless facilities to serve subscribers
 - Antennas are mounted on



- ❖ Towers
- ❖ Rooftops
- ❖ Chimneys, steeples, cupolas, etc.
- ❖ Utility poles and power line stanchions



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Wireless Facilities

- What is a Cell Site?
 - ✓ Any installation of wireless facilities to serve subscribers
 - Base station/Access point equipment is mounted
 - ❖ In buildings
 - ❖ On rooftops
 - ❖ Outdoors
 - ❖ On utility poles



Wireless Facilities - Monopole



Monopole Tower with Platform Antenna Mounts



Wireless Facilities – “Lattice” Tower



Self-support



Guyed

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Wireless Facilities – “Stealth”



Viking Hotel Newport RI



“Stealth” facility - Natick

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Wireless Facilities – “Stealth”



Chimney



School “cupola”-
Westwood, MA

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Wireless Facilities Concealed Antenna Monopole (“Unipole,” “Flagpole,” “Slick-Stick”)



Lincoln

- ✓ 80 ft
monopole
- ✓ 3 carriers

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Wireless Facilities – Concealed Antenna Monopole



Martha's Vineyard

- ✓ 70 ft
monopole
- ✓ 3 carriers
- ✓ High ground
- ✓ Low
vegetation
- ✓ Covers off

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Wireless Facilities “Flush Mount” Monopole



Westwood MA

- ✓ 140 ft
monopole
- ✓ 3 carriers
- ✓ Antennas are
surface
mounted
- ✓ Called a
“Flush
Mount”
Monopole
- ✓ All painted

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Wireless Facilities



Medfield, MA

✓ 110 ft
standpipe

✓ Top and rim

Guilford,
CT

✓ 80 ft



Wireless Facilities – “Monopine” “Tree-pole”



“Monopines”

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Wireless Facilities



Electrical Transmission Stanchions

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Wireless Facilities



Ground Equipment

Shed at Guilford Tank

Cabinets at Lenox Tower

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Wireless Facilities – DAS Nodes



DAS Antenna on Lamppost
Back Bay Boston

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Wireless Facilities – DAS Nodes



DAS Antennas and Electronics on Utility Poles
Nantucket

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Wireless Facilities – DAS Nodes



DAS Antennas on Utility Poles
Brookline MA

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Wireless Facilities



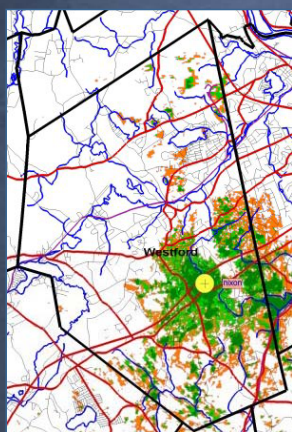
DAS Equipment Room
Brookline MA

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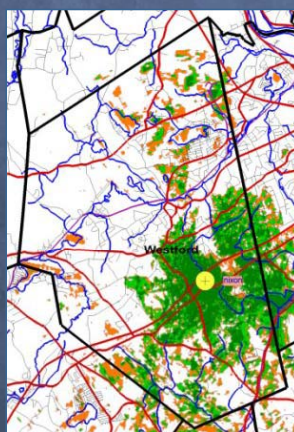


Coverage Area by Service Type

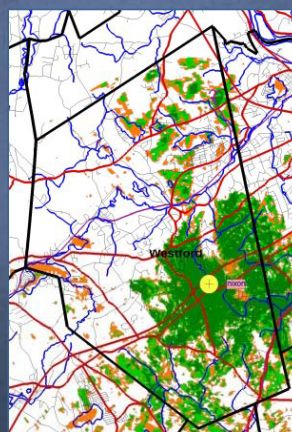
ATT Nixon Road PCS



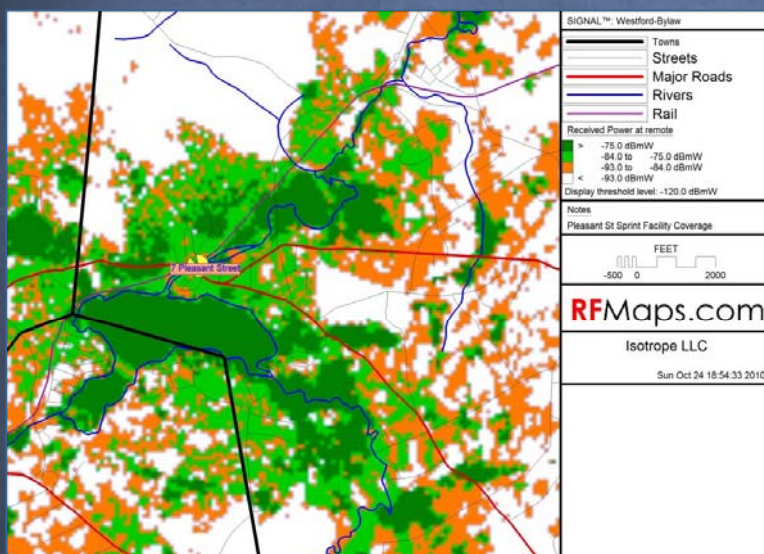
ATT Nixon Road Cellular

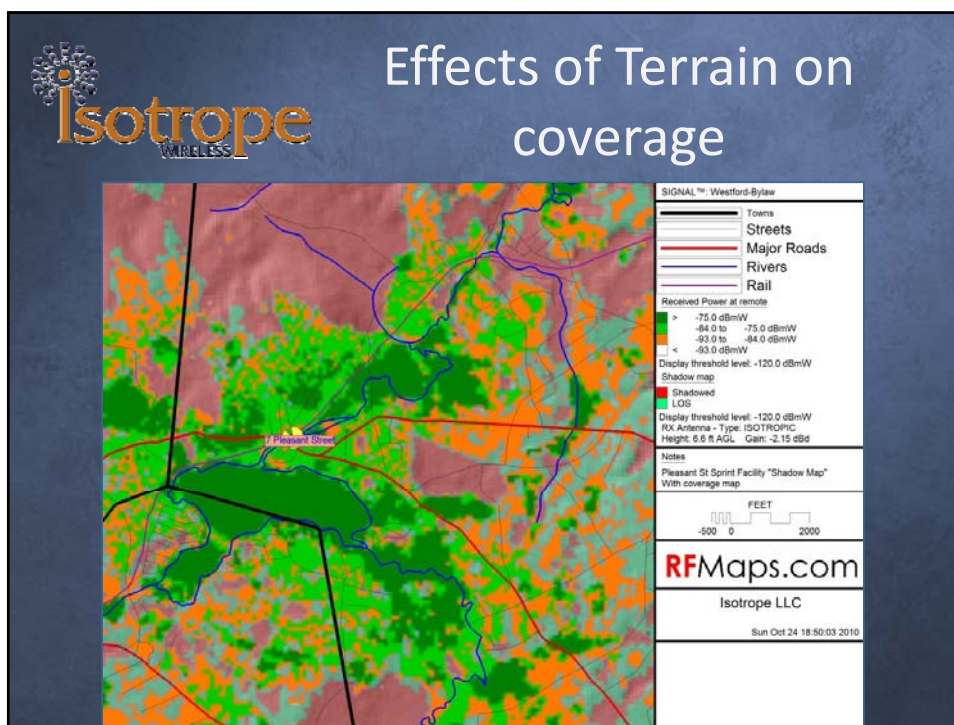
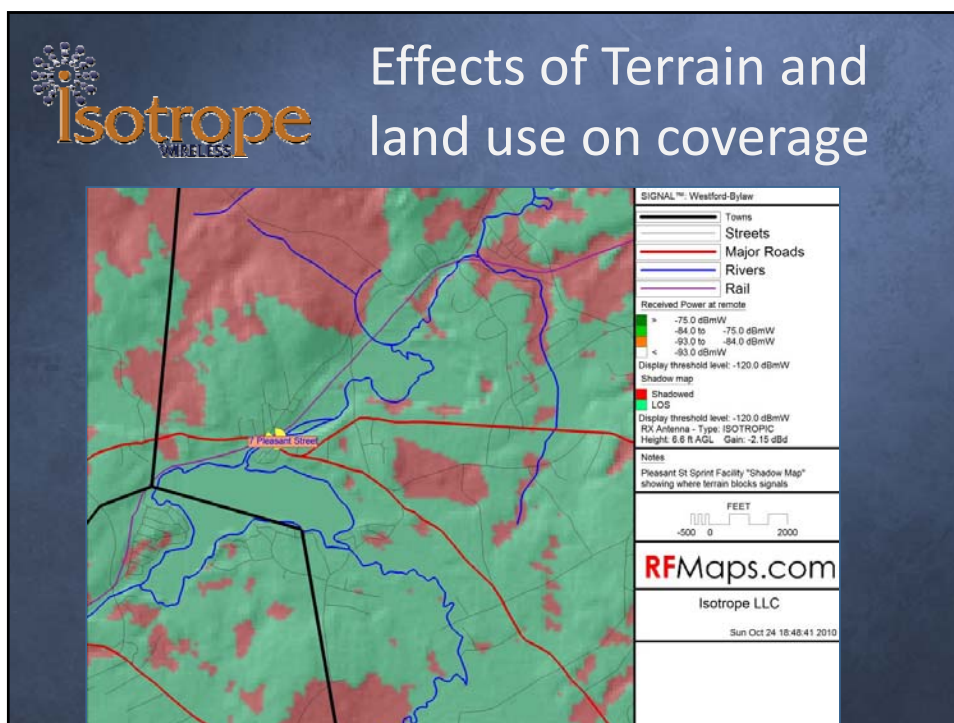


ATT Nixon Road 700 MHz



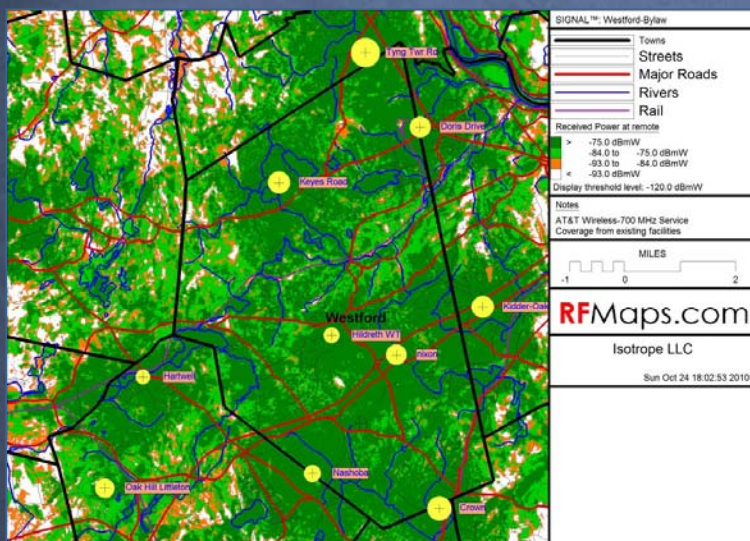
Effects of Terrain on coverage



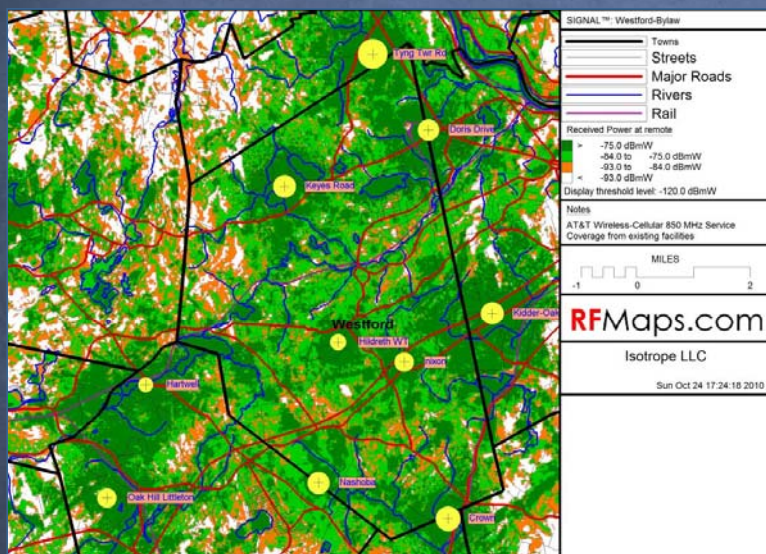




Case Study: ATT 700 MHz Coverage

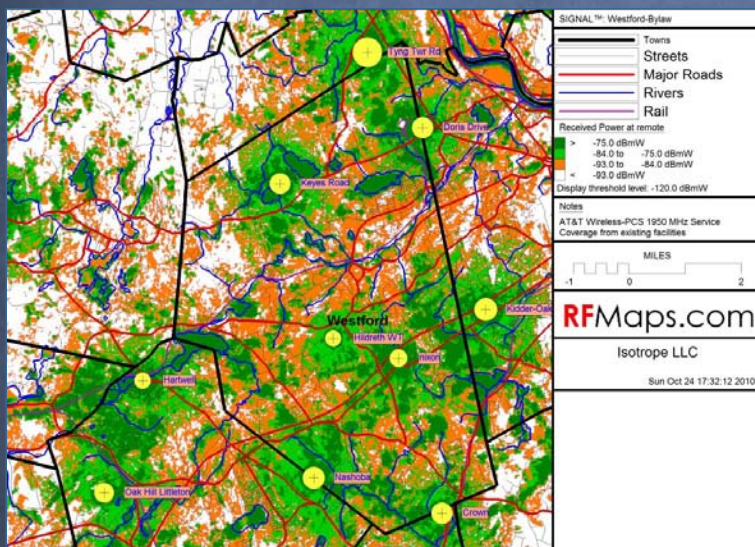


Case Study: ATT Cellular Coverage

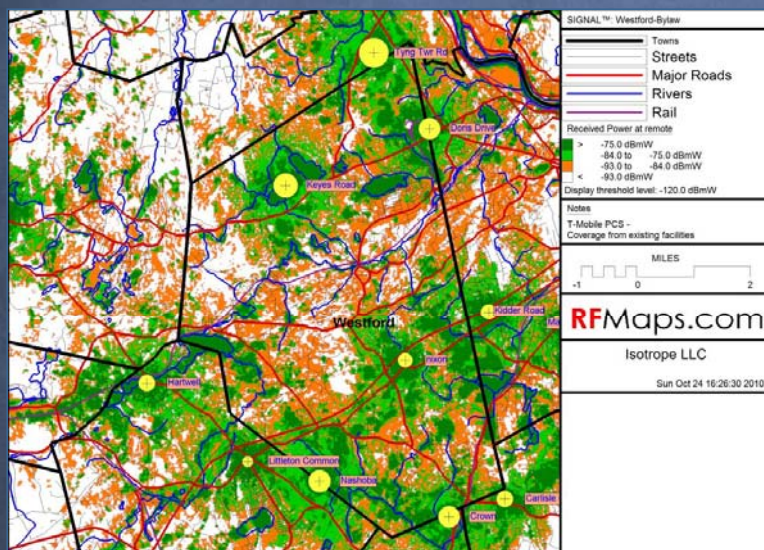




Case Study: ATT PCS Coverage

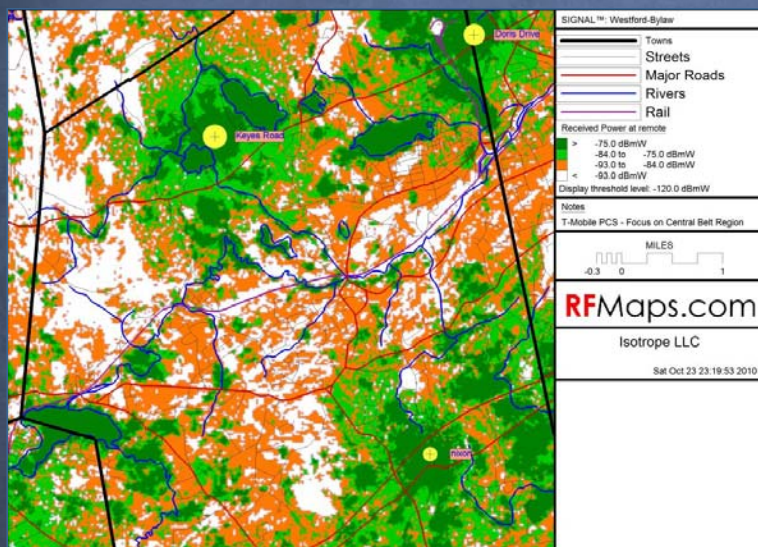


Case Study: T-Mobile

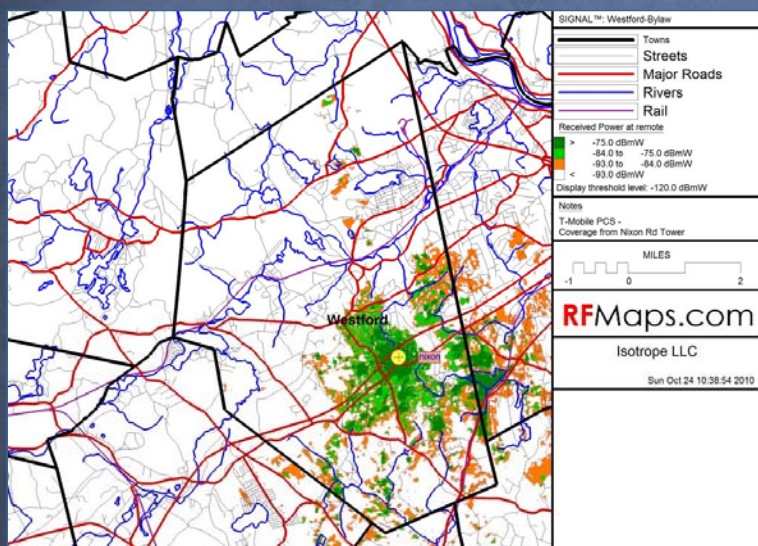




Case Study: T-Mobile



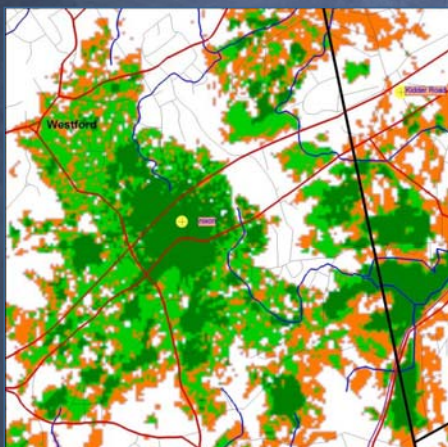
Case Study: T-Mobile



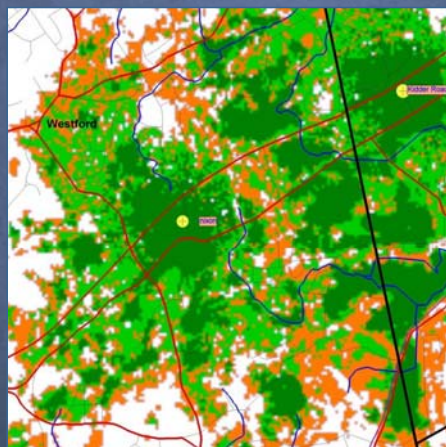


Case Study: T-Mobile

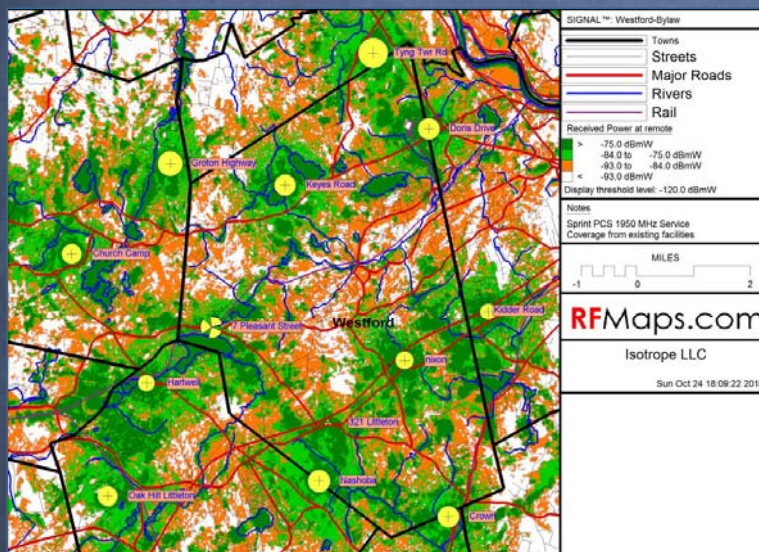
Nixon Road Coverage by itself



Then we add in Kidder Road



Case Study: Sprint PCS



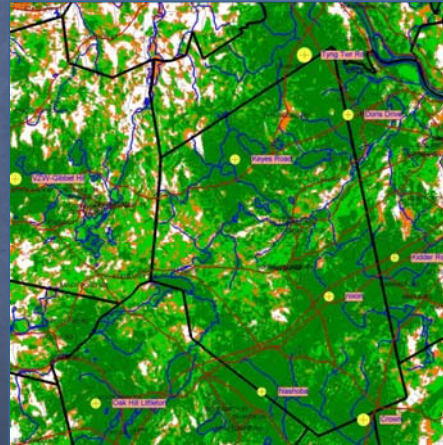


Case Study: Verizon

Verizon Estimated Cellular Coverage



Verizon Estimated 700Mhz Coverage



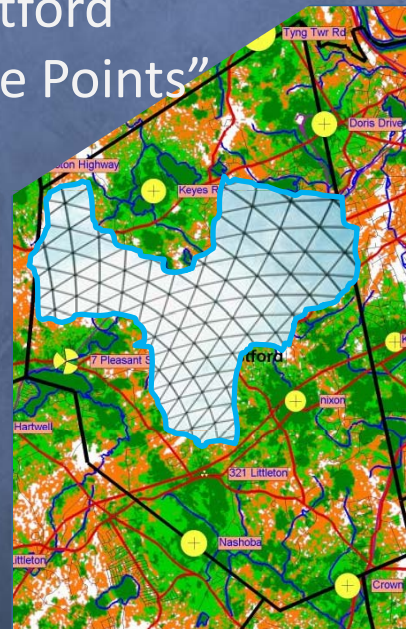
Case Study Westford Massachusetts

- PCS Spectrum
 - ✓ Sprint
 - ✓ T-Mobile
 - ✓ AT&T
 - ✓ Verizon
- "AWS" Spectrum
 - ✓ MetroPCS
- "BRS" Spectrum
 - ✓ Clearwire
- ♦ Coming Up!
 - ♦ 700 MHz Spectrum
 - ♦ Expect activity in next year or so
 - ♦ Existing and New Carriers
 - ♦ ATT, Verizon, MetroPCS, Qualcomm



Westford "Pressure Points"

- ✓ Central Belt Portions of Westford
 - Forge Village Rd
 - Main Street
 - Lowell Rd
 - Plain Rd
 - Depot St
 - West St
 - North St
 - Portions of Groton Rd
 - ❖ (Route 40)



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Westford "Pressure Points"

- Pressure Points
 - ✓ Other Pockets
 - Tyngsboro Rd
 - Portions of Concord Rd
 - Route 27 (in Westford)



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Wireless Coverage

- Common Strategies
 - ✓ Commercial/Industrial properties
 - In or out of district
 - ✓ Very large parcels
 - Not close to residences – limits:
 - ❖ Must reach farther; provides less in-building service
 - ❖ Large parcels often encumbered
 - ✓ Municipal/institutional parcels
 - ✓ Integrated design

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Next Steps

- Review of land and structures, including town-owned land, to evaluate least invasive options for provision of wireless service
- Resident input welcome!
- Second public workshop in January 2011
- Evaluation of existing Westford WCF Bylaw and proposal for potential amendment at March 2011 Annual Town Meeting



Westford Wireless Coverage

Thank You

Isotrope, LLC

www.isotrope.im

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To Stay Informed

- Sign up for email alerts
- Review town website and check for periodic updates at:
 - ✓ www.westfordma.gov/wca
- Sign up for website updates by RSS feed
- Sign up to received Planning Board and ZBA agendas by RSS feed
- Attend January workshop, and future hearings regarding proposed zoning amendment(s)